

CLAIMS:

1 1. A method for providing enhanced slice
2 prediction comprising:
3 receiving an input containing first and
4 second data, wherein the first and second data have
5 different bit rates and are defined by the same n level
6 constellation;
7 decoding only the second data with a decoder;
8 producing an output in response to the input
9 and the decoder, wherein the output is confined to at
10 least one but fewer than $n/2$ of the n constellation
11 levels, and wherein $n > 2$; and,
12 providing the output as the enhanced slice
13 prediction.

1 2. The method of claim 1 wherein the
2 decoder is a first decoder, wherein the receiving of an
3 input comprises decoding the input with a second
4 decoder to recover the first and second data, wherein
5 the second decoder has n states, wherein the producing

6 of an output comprises choosing $n/4$ states out of $n/2$
7 states of the n states of the second decoder, and
8 wherein the providing of the output comprises providing
9 the $n/4$ states as the enhanced slice prediction.

1 3. The method of claim 2 further comprising
2 delaying the selection of the $n/4$ states based upon a
3 processing time of the second decoder.

1 4. The method of claim 1 wherein n is
2 eight, wherein the decoder is a first decoder, wherein
3 the receiving of an input comprises decoding the input
4 with a second decoder to recover the first and second
5 data, wherein the second decoder has eight states,
6 wherein the producing of an output comprises choosing
7 only two states out of four states of the eight states
8 of the second decoder, and wherein the providing of the
9 output comprises providing the two states as the
10 enhanced slice prediction.

1 5. The method of claim 4 further comprising
2 delaying the selection of the two states based upon a
3 processing time of the second decoder.

1 6. The method of claim 1 wherein n is
2 eight, wherein the decoder is a first decoder, wherein
3 the receiving of an input comprises decoding the input
4 with a second decoder to recover the first and second
5 data, wherein the second decoder has eight states,
6 wherein the producing of an output comprises choosing
7 only one state out of four states of the eight states
8 of the second decoder, and wherein the providing of the
9 output comprises providing the one state as the
10 enhanced slice prediction.

1 7. The method of claim 6 further comprising
2 delaying the choosing of the one state based upon a
3 processing time of the second decoder.

1 8. The method of claim 1 wherein the
2 producing of an output comprises:
3 decoding the input when the second data is
4 not available so as to produce the output; and,
5 decoding the second data when the second data
6 is available so as to produce the output.

1 9. The method of claim 8 further comprising
2 delaying the decoding of the input based at least in
3 part upon a processing time of the decoder.

1 10. The method of claim 8 wherein the
2 providing of the output as the enhanced slice
3 prediction comprises providing only one state as the
4 enhanced slice prediction.

1 11. The method of claim 8 further comprising
2 selecting between decoding the input and the second
3 data in response to a received map.

1 12. The method of claim 8 wherein the first
2 data comprises eight level non-RVSB symbols, and
3 wherein the second data comprises eight level RVSB
4 symbols.

1 13. The method of claim 8 wherein the
2 providing of the output as the enhanced slice
3 prediction comprises providing the enhanced slice
4 prediction based upon a known training signal when a
5 transmitted training signal is contained in a received
6 signal.

1 14. The method of claim 1 wherein the
2 decoder is a first decoder, wherein the receiving of an
3 input comprises decoding the input with a second
4 decoder to recover the first and second data, wherein
5 the decoding of only the second data comprises decoding
6 the second data with the first decoder to produce
7 decoded second data, and wherein the producing of an
8 output comprises;

9 producing the output by decoding the input
10 with a third decoder when the decoded second data is
11 not available; and,
12 producing the output by decoding the second
13 decoded data with the third decoder when the decoded
14 second data is available.

1 15. The method of claim 14 further
2 comprising delaying the decoding of only the input.

1 16. The method of claim 14 wherein the third
2 decoder implements a Viterbi algorithm.

1 17. The method of claim 14 wherein the
2 providing of the output as the enhanced slice
3 prediction comprises providing only one state of the
4 third decoder as the enhanced slice prediction.

1 18. The method of claim 14 further
2 comprising selecting between decoding the input and the
3 decoded second data in response to a received map.

1 19. The method of claim 14 wherein the first
2 data comprises eight level non-RVSB symbols, and
3 wherein the second data comprises eight level RVSB
4 symbols.

1 20. The method of claim 14 wherein the
2 providing of the output as the enhanced slice
3 prediction comprises providing the enhanced slice
4 prediction based upon a known training signal when a
5 transmitted training signal is contained in a received
6 signal.

1 21. The method of claim 1 further comprising
2 providing the enhanced slice prediction as feedback to
3 an equalizer.

1 22. The method of claim 1 further comprising
2 providing the enhanced slice prediction as feedback to
3 a phase tracker.

1 23. The method of claim 1 wherein the
2 providing of the output as the enhanced slice
3 prediction comprises providing the enhanced slice
4 prediction based upon a known training signal when a
5 transmitted training signal is contained in a received
6 signal.

1 24. An apparatus for providing enhanced
2 slice prediction comprising:
3 an inner decoder that inner decodes a
4 received signal to provide an inner decoded output,
5 wherein the inner decoder produces $n/2$ possible
6 decoding states based upon the received signal, wherein
7 the received signal contains data having n levels, and
8 wherein $n > 2$;
9 an outer decoder that outer decodes the inner
10 decoded output; and,
11 an enhanced slice predictor that chooses at
12 least one but fewer than the $n/2$ of the $n/2$ possible
13 decoding states based upon an output of the outer

14 decoder and that provides the chosen state or states as
15 the enhanced slice prediction.

1 25. The apparatus of claim 24 wherein n is
2 eight, wherein the enhanced slice predictor chooses two
3 of the four possible states based upon the output of
4 the outer decoder, and wherein the enhanced slice
5 predictor provides the chosen two states as the
6 enhanced slice prediction.

1 26. The apparatus of claim 24 wherein n is
2 eight, wherein the enhanced slice predictor chooses two
3 and only two of the four possible states based upon the
4 output of the second decoder, and wherein the enhanced
5 slice predictor provides the chosen two and only two
6 states as the enhanced slice prediction.

1 27. The apparatus of claim 24 wherein n is
2 eight, wherein the enhanced slice predictor chooses one
3 of the four possible states based upon the output of
4 the outer decoder, and wherein the enhanced slice

5 predictor provides the chosen one state as the enhanced
6 slice prediction.

1 28. The apparatus of claim 24 wherein n is
2 eight, wherein the enhanced slice predictor chooses one
3 and only one of the four possible states based upon the
4 output of the second decoder, and wherein the enhanced
5 slice predictor provides the chosen one and only one
6 state as the enhanced slice prediction.

1 29. The apparatus of claim 24 further
2 comprising a delay that delays operation of the
3 enhanced slice predictor based upon a processing time
4 of the inner decoder.

1 30. The apparatus of claim 24 wherein the
2 inner decoder is an ATSC decoder, and wherein the outer
3 decoder is an RVSB decoder.

1 31. The apparatus of claim 24 further
2 comprising an equalizer coupled to receive the enhanced
3 slice prediction as feedback.

1 32. The apparatus of claim 24 further
2 comprising a phase tracker coupled to receive the
3 enhanced slice prediction as feedback.

1 33. An apparatus for providing enhanced
2 slice prediction comprising:

3 an inner decoder that inner decodes a
4 received signal containing first and second data to
5 provide inner decoded first and second data;

6 an outer decoder that outer decodes only the
7 second data; and,

8 an enhanced slice predictor that provides a
9 prediction output based upon the first data when the
10 second data is not available and based upon the outer
11 decoded second data when the second data is available.

1 34. The apparatus of claim 33 wherein the
2 each of the first and second data are 8 level symbols
3 having different bit rates.

1 35. The apparatus of claim 33 wherein the
2 enhanced slice predictor implements a Viterbi
3 algorithm.

1 36. The apparatus of claim 33 wherein the
2 prediction output is a single symbol.

1 37. The apparatus of claim 33 further
2 comprising a delay that delays operation of the
3 enhanced slice predictor.

1 38. The apparatus of claim 33 wherein the
2 first data are non-RVSB symbols, and wherein the second
3 data are RVSB symbols.

1 39. The apparatus of claim 33 wherein the
2 first decoder is an ATSC decoder, and wherein the
3 second decoder is an RVSB decoder.

1 40. The apparatus of claim 33 further
2 comprising an equalizer coupled to receive the enhanced
3 slice prediction as feedback.

1 41. The apparatus of claim 33 further
2 comprising a phase tracker coupled to receive the
3 enhanced slice prediction as feedback.

1 42. The apparatus of claim 33 wherein the
2 enhanced slice predictor bases its slice prediction
3 upon a known training signal when a transmitted
4 training signal is contained in a received signal.